



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,375	01/17/2002	Tac Bong Eom	PAS202A	9703

7590 11/05/2003

Irving M. Weiner
WEINER & BURT, P.C.
635 N. US-23
P.O BOX 186
HARRISVILLE, MI 48740

EXAMINER

LYONS, MICHAEL A

ART UNIT	PAPER NUMBER
----------	--------------

2877

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/051,375	EOM ET AL.	
	Examiner	Art Unit	
	Michael A. Lyons	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Yamashita et al (6,172,560) and in further view of Kato (6,294,952).

Regarding claims 1-4, the combination of the prior art and Yamashita, as discussed below with regards to claims 5-10, discloses all of the claimed elements of the invention and therefore the claimed method of the invention can be applied to the combined device in order to facilitate the desired results of the invention.

However, neither the prior art nor Yamashita discloses the use of an ellipse and ellipse parameters to aid in the calculation of the necessary phase angles and the according linearity correction. Kato, in claim 37, discloses the use of an ellipse that is used to obtain a DC offset

error, a phase error, and an amplitude error. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ellipse technique of Kato to the combination of the prior art and Yamashita to aid in the necessary calculations, as the ellipse parameters are well known mathematical statements.

With specific regard to claim 2, Official Notice is taken as to the use of a lookup table to aid in calculations over the use of a device, and it would have been obvious to one of ordinary skill in the art at the time the invention was made to use such a table to aid in calculation, as such a lookup table for value comparison would be used simply for comparing earlier data from results generated from continued usage of the device.

Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Yamashita et al (6,172,560).

Regarding claim 5, the prior art (Fig. 1) discloses a two-frequency laser interferometer (entire figure), 90-degree phase mixing electronics in the form of a 90-degree phase shifter 7, and phase angle calculating electronics 400. The prior art, however, fails to disclose a nonlinearity error correcting electronics.

Yamashita (Fig. 1) teaches the use of a circuit that rejects and compensates for non-linear distortions in the system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the circuit of Yamashita to the prior art device in order to correct the admitted linearity issues that arise during the displacement detection and measurement of the prior art device.

As for claim 6, the prior art discloses a laser 1, a first beam splitter 2, a photodetector 6a in the reference path, a polarizing beam splitter 3, and a photodetector 6b in the measuring path.

As for claim 7, the prior art discloses a 90-degree phase shifter 7, a first mixer 8a, a second mixer 8b, and a pair of low pass filters 9a and 9b.

As for claim 8, Hamashita discloses offset adjustment circuits 44 and 46, while Fig. 4 is a depiction of phase and amplitude adjustment means. Official Notice is taken as to the common use of a microprocessor to obtain and calculate ellipse parameters, or to perform any other mathematical calculation necessary on the results of an apparatus.

As for claims 9 and 10, giving a series of elements a free order of arrangement is a matter of design choice and therefore is well known.

Response to Arguments

Applicants' arguments filed September 3, 2003 have been fully considered but they are not persuasive. The applicants argue that the above combination of the prior art, Yamashita, and Kato, in varying forms, as disclosed above, are merely hypothetical combinations made in hindsight, as no motivation exists to combine the circuitry and electronics of Yamashita and Kato with the prior art to generate the claimed apparatus in the instant application.

All electronic devices and circuitry function as the result of electric signals being input into them. Inputting the light straight from the prior art interferometer into the electronics would obviously fail. However, the prior art interferometer features photodetectors 6a and 6b, which receive light that has traveled through the system, and then converts the light into electric signals for processing and analysis. In the prior art apparatus, these signals end up at electronics of a sort, the phase angle calculating electronics 400 that also exists in the claimed apparatus. As a result, the motivation exists for applying the electronics of Kato and Yamashita to the prior art interferometer. Having these electronics be the major initial input for the electronic signals

generated by the photodetector pair rather than the phase angle calculating electronics would be obvious to one of ordinary skill in the art, as the Yamashita device corrects the non-linear distortion present in an electric signal, while the Kato device applies quadrature demodulation with ellipse parameters for phase and amplitude error measurement and correction.

In addition, while the applied references fail to show the exact equation disclosed in the method claims, the actual elements to the equation are not mathematically unique. The arctangent, cosine, and sine functions are common trigonometric elements. The variables b and a are amplitudes, and the varying “ I ” variables are phase components. Kato’s device is used in phase and error measurement and correction, in addition to the use of an ellipse in calculation aid as disclosed above. The above components of the equation would be used in some way in the calculations carried out by the device.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Application/Control Number: 10/051,375
Art Unit: 2877


Page 6

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Lyons whose telephone number is 703-305-1933. The examiner can normally be reached on Monday thru Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G Font can be reached on 703-308-4877. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0935.

MAL
October 29, 2003



Samuel A. Turner
Primary Examiner